

Replacement Sheet

Sheet 1 of 14

Appl. No.: 09/100,088; Filed: June 19, 1998

Dkt No.: 1606.0020004; Group Unit: 2123

Inventor: Peter G. BROWN; Tel. No.: 202-371-2600

For: Method for Scheduling Solution Preparation in
Biopharmaceutical Batch Process Manufacturing
(As Amended)

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Unit Operation Type	Group 1			Parameter
	Parameter	Soln.		
T1 Inoculum Prep	Number of Flasks Media Volume/Flask		2 0.25 Liters	Temperature Agitation Duration
T2 Flask Growth	Scale Up Ratio Media Volume/Flask		10 Fold 1.25 L	Temperature Agitation Duration
T3 Fermentation Production	Scale Up Ratio Fermentor Working Volume Antifoam A Antifoam B Base Acid	S-101 S-102 S-103 S-104 S-105	10 Fold 500 Liters 1 MI/L 1 MI/L 5 MI/L 5 MI/L	Growth Temperature Agitation Spurge Rate Back Pressure Total Duration
T4 Initial Seeding	Number of Ampules Volume Per Ampule Starting Cell Density Ampule Split Ratio Culture Vessel Type Feed Volume		2 2 MI 300,000 Cells/MI 1 Vessels/Ampule Roll. Bot. 100 MI	Serum Content Feed Rate Days to Confluence
T5 Culture Vessel Split	Vessel Split Ratio New Vessel type Feed Volume Serum Content		2 PB 100 MI 2.0% Fetal Bovine Serum	Feed Rate Days to Confluence
T6 Spinner Flask Seeding	Flask Feed Volume Vessel/Flask Ratio uCarrier Density Number of PBS Washes Number of Media Washes No. of Media/Serum Washes		4 Liters 0.1 L Cells/L Flask 5 Ga/Liter 2 1 2 FBS	Serum Content Feed Rate Days to Confluence
T7 Biosynthesis Bioreactor Preparation (Stirred Tank Reactor)	Reactor Feed Volume Spinner/Reactor Ratio uCarrier Density Number of PBS Washes Number of Media Washes No. of Media/Serum Washes		500 Liters 8.3 5 Ga/Liter 2 1 2	Serum Content Feed Rate Days to Confluence Serum Free Media Washes
T8 Biosynthesis Bioreactor Preparation (Hollow Fiber Reactor)	Reactor Feed Volume Number of PBS Washes Number of Media Washes No. of Media/Serum Washes Serum Content		100 Liters 2 2 2 2.0% Fetal Bovine Serum	Number of Reactors Feed Rate Days to Confluence
T9 Biosynthesis Bioreactor Preparation (Fluidized Bed Reactor)	Reactor Feed Volume uCarrier Density Number of PBS Washes Number of Media Washes No. of Media/Serum Washes Serum Content		Liters Gas/L	Number of Reactors Feed Rate Days to Confluence
T10 Initial seeding	Number of Ampules Volume Per Ampule Starting Cell Density Ampule Split Ratio		2 2 MI 300,000 Cells/MI 1 Vessels/Ampule	Serum Content Feed Rate Days to Confluence

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Group 2		Group 3	
Soln.		Parameter	Soln.
	37 C 200 RPM 18 Hours	Final OD	12
	37 C 200 Hours 18 RPM	Final OD	12
	37 Hours 1 HP/100L 1.5 VVM 5 PSIG 21 Hrs	Final OD Dry Cell Mass Product Concentration CIP	12 9.96 Gas TDCM/L 0.3 Gas Product/L
	2.0% Fetal Bovine Serum 1 Feed per vessel per 2 Days 2 Days	Amplification Factor	100%
	1 Feed per vessel per 2 Days 2 Days	Amplification Factor	100%
	2.0% Fetal Bovine Serum 1 Feed per vessel per 2 Days 2 Days	Amplification Factor	100%
	2.0% Fetal Bovine Serum 1 Feed per vessel per 2 Days 10 Days 2	Product Concentration Total Protein Concen.	2500% Mg Prod/L 0.125 Mg TP/MI
	1 1 Feed per vessel per 1 Days 10 Days	Harvest Volume Product Concentration Total Protein Concen.	500% Liters 25 Mg Prod/L 0.125 Mg TP/MI
	1 1 Feed per vessel per 1 Days 10 Days	Product Concentration Total Protein Concen.	2500% Mg Prod/L 0.125 Mg TP/MI
	2.0% Fetal Bovine Serum 1 Feed per vessel per 2 Days 2 Days	Amplification Factor	100%

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Unit Operation Type	Group 1		
	Parameter	Soln.	Parameter
	Culture Vessel Type	Roll. Bot.	PBS Washes
	Feed Volume	100 MI	Trypsin Wash
11 Culture Vessel Split	Vessel Split Ratio	2	Feed Rate
	New Vessel Type	RB	Days to Confluence
	Feed Volume	100 MI	PBS Washes
	Serum Content	2.0% Fetal Bovine Serum	Trypsin Wash
12 Spinner Flask Split	Flask Feed Volume	4 Liters	Serum Content
	Vessel/Flask Ratio	0.1 L Cells/L Flask	Feed Rate
	uCarrier Density	5 Gm/Liter	Days to Confluence
	Number of PBS Washes	2	
	Number of Media Washes	1	
	No. of Media/Serum Washes	2	
13 Biosynthesis Bioreactor Preparation (Stirred Tank Reactor)	Reactor Feed Volume	500 Liters	Serum Content
	Spinner/Reactor Ratio	8.3	Feed Rate
	uCarrier Density	5 Gm/Liter	Days to Confluence
	Number of PBS Washes	2	Serum Free Media Washes
	Number of Media Washes	1	
	No. of Media/Serum Washes	2	
14 Biosynthesis Bioreactor Preparation (Fluidized Bed Reactor)	Reactor Feed Volume	Liters	Number of Reactors
	uCarrier Density	Gms/L	Feed Rate
	Number of PBS Washes		Days to Confluence
	Number of Media Washes		
	No. of Media/Serum Washes		
	Serum Content		
15 Initial Coupling	Flask Feed Volume	4 Liters	Serum Content
	Vessel/Flask Ratio	0.1 L Cells/L Flask	Feed Rate
	uCarrier Density	5 Gm/Liter	Days to Confluence
	Number of PBS Washes	2	
	Number of Media Washes	1	
	No. of Media/Serum Washes	2 FBS	
16 Additional Coupling	Reactor Feed Volume	500 Liters	Serum Content
	Spinner/Reactor Ratio	8.3	Feed Rate
	uCarrier Density	5 Gm/Liter	Days to Confluence
	Number of PBS Washes	2	Serum Free Media Washes
	Number of Media Washes	1	
	No. of Media/Serum Washes	2	
17 Peptide Cleavage	Reactor Feed Volume	100 Liters	Number of Reactors
	Number of PBS Washes	2	Feed Rate
	Number of Media Washes	2	Days to Confluence
	No. of Media/Serum Washes	2	
	Serum Content	2.0% Fetal Bovine Serum	
18 Tissue Thawing	Crude Product Yield	25 Gm Crude Prod./Kg Tissue	Contaminant Protein Conc.
	Environmental Temperature	25 C	
	Thaw Duration	16 Hours	
19 Homogenization	Crude Product Yield	25 Gm Crude Prod./Kg Tissue	Contaminant Protein Conc.
	Liquid/Solid Ratio	10 L Solution/Kg Tissue	
	Homogenization Temp.	4 C	
	Homogenizer Type	RS	
	Energy Input	200 HP/100L/Hr	
	Duration	4 Hours	
20 Liquid Thawing			

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Group 2			Group 3		
	Soln.		Parameter	Soln.	
		200 HI 100 HI			
		1 Feed per vessel per 2 Days 2 Days 200 HI 100 HI	Amplification Factor		100%
		2.0% Fetal Bovine Serum 1 Feed per vessel per 2 Days 2 Days	Amplification Factor		100%
		2.0% Fetal Bovine Serum 1 Feed per vessel per 2 Days 10 Days 2 Days	Product Concentration Total Protein Concn.		2500% Mg Prod/L 0.125 Mg TP/HI
		1 1 Feed per vessel per 1 Days 10 Days	Product Concentration Total Protein Concn.		2500% Mg Prod/L 0.125 Mg TP/HI
		2.0% Fetal Bovine Serum 1 Feed per vessel per 2 Days 2 Days	Amplification Factor		100%
		2.0% Fetal Bovine Serum 1 Feed per vessel per 2 Days 10 Days 2	Product Concentration Total Protein Concn.		2500% Mg Prod/L 0.125 Mg TP/HI
		1 1 Feed per vessel per 1 Days 10 Days	Harvest Volume Product Concentration Total Protein Concn.		500% Liters 25 Mg Prod/L 0.125 Mg TP/HI
		100 Gm/L	Temperature Regulation CIP SIP	Y Y Y	
		100 Gm/L	Temperature Regulation CIP SIP	Y Y Y	
			Amplification Factor		100%

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Unit Operation Type	Group 1			Parameter
	Parameter	Soln.		
21 Product Ppt by Solids	Reagent Concentration		1 M	Kgms of Reagent/Liters Product Temperature Addition Time Additional Mix Time
22 Product Ppt by Liquids	Reagent Concentration		1 M	Liters Reagent/Liters Product Temperature Addition Time Additional Mix Time
23 Contaminant Ppt by Solids	Reagent Concentration		1 M	Kgms of Reagent/Liters Product Temperature Addition Time Additional Mix Time
24 Contaminant Ppt by Liquids	Reagent Concentration		1 M	Liters Reagent/Liters Product Temperature Addition Time Additional Mix Time
25 Solids Harvest Tangential Flow MF	Porosity Average Flux Rate Total Throughput Filtration Time		0.2 Micron 11 L/SF/HR at 40 Psig at 4 C 400 Liters/SF 1 HR	Flush Prime Concentration Factor Wash Regenerate Store
26 Continuous Centrifugation Solids Harvest	System Void Volume		5 Liters	RCF Time Volume Reduction Wash Volume
27 Continuous Centrifugation Supernatant Harvest	System Void Volume		6 Liters	RCF Time Volume Reduction Wash Volume
28 Dilution	System Void Volume		6 Liters	RCF Time Volume Reduction Wash Volume
29 Batch Centrifugation Solids Harvest	System Void Volume		6 Liters	RCF Time Volume Reduction Wash Volume

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Group 2		Group 3	
Soln.		Parameter	Soln.
	0.25 Kg/L 4 C 0.5 Hours 2 Hours	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	95% 95% Y Y Y
	0.25 L/L 4 C 0.5 Hours 2 Hours	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	95% 95% Y Y Y
	0.25 Kg/L 4 C 0.5 Hours 2 Hours	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	95% 95% Y Y Y
	0.25 L/L 4 C 0.5 Hours 2 Hours	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	95% 95% Y Y Y
	2 L/SF 2 L/SF 10 Fold 0.5 L/SF 1 L/SF 2 L/SF	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	95% 95% Y Y Y
	10,000 X 6 60 Minutes 30 X Vol. Reduction 0.2 X System Void Volume	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	95% 95% Y Y Y
	10,000 X 6 30 Minutes 0.062 X Vol. Reduction 1.5 X System Void Volume	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	85% 0.3 Y Y Y
	10,000 X 6 30 Minutes 16 X Vol. Reduction 1.5 X System Void Volume	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	95% 0.95 Y Y Y
	10,000 X 6 30 Minutes 16 X Vol. Reduction 1.5 X System Void Volume	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP	95% 0.95 Y Y

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Unit Operation Type	Group 1			Parameter
	Parameter	Soln.		
130 Batch Centrifugation Supernatant Harvest	System Void Volume		6 Liters	RCF Time Volume Reduction Wash Volume
131 Cell Disruption High Press. Homogen.	Product Temperature Utility Temperature Void Volume		8 C 2 C 5 Liter	Number of Passes Pressure Flow Rate Temperature Increase
132 Cell Disruption Bead Mill	Number of Passes Bead Size Void Volume Flow Rate		2 0.5 LPM	
133 Cell Disruption Chemical Lysis	Reagent Temperature Exposure Time		0.5 M NaOH 4 C 2 Hours	Liters Reagent/Gm Product Titration
134 Microfiltration Tangential Flow	Porosity Average Flux Rate Total Throughput Filtration Time		0.2 Micron 50 L/SF/HR at 40 Psig at 4 C 400 Liters/SF 2 HR	Flush Prime Wash Solids Regenerate Store
135 Microfiltration Dead End	Porosity Average Flux Rate Total Throughput Filtration Time		0.2 Micron 50 L/SF/HR at 40 Psig at 4 C 400 Liters/SF 0.5 HR	Flush Prime Wash Solids Regenerate Store
136 Ultrafiltration Concentration/Dilution	Porosity Average Flux Rate Concentration Time		60 K MWL 3 L/SF/HR at 40 Psig at 4 C 2 HR	Flush Prime Wash Dilute Concentrate Solids Regenerate
137 Ultrafiltration Flow Dialysis	Porosity Average Flux Rate Dialysis Time		60 K MWL 3 L/SF/HR at 40 Psig at 4 C 2 HR	Flush Prime Dialysis Buffer Wash Solids Regenerate
138 Prod. Ads. Chromatography HPLC	Column Capacity Column Oversize Factor Column Aspect Ratio Max. Linear Velocity		10 MG Prod./ML Of Packing 1.5 Fold 0.37 H ₂ O 100 CM/HR at 45 Psig and 4 C	Column Equilibration Column Wash Column Elute A Column Elute B Column Regenerate Column Store
139 Prod. Ads. Chromatography HPLC	Column Capacity Column Oversize Factor		10 MG Prod./ML Of Packing 1.5 Fold	Column Equilibration Column Wash

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Group 2			Group 3		
Soln.			Parameter	Soln.	
			SIP		Y
	10,000 XG 30 Minutes 16 X Vol.Reduction 1.5 X System Void Volume		Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		95% 0.95 Y Y Y
	6 Times 12,000 PSI 5 LPH 1.8 Degrees C/1,000 PSI		Rinse Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		500% Void Volumes 95% 95% Y Y Y
			Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		95% Y Y Y
	0.4 L/Ga 0 MI/Liter		Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		95% Y Y Y
	2.00 L/SF 2.00 L/SF 0.50 L/SF 0.30% Of Product Solution 1.00 L/SF 2.00 L/SF		Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		95% 95% Y Y Y
	0 L/SF 0 L/SF 0.50 L/SF 0.003 Of Product Solution 1 L/SF 2 L/SF		Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		95% 0.95% N N N
	2.00 L/SF 2.00 L/SF 0.50 L/SF 10.0 Fold 0.30% Of Product Solution 1.00 L/SF		Store Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		2.00 L/SF 95% 95% Y Y Y
	2 L/SF 2.00 L/SF 5.0 X Feed Stream Volume 0.50 L/SF 0.30% Of Product Solution 1.00 L/SF		Store Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		200% L/SF 95% 95% Y Y Y
	5 Column Volumes 3 Column Volumes 3 Column Volumes 0 Column Volumes 1 Column Volumes 2 Column Volumes		Prod.Elution Volume Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		80% 95% 95% N Y Y
	5 Column Volumes 3 Column Volumes		Prod.Elution Volume Step Recovery of Product		80% 95%

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Unit Operation Type				Parameter
	Parameter	Soln.		
	Column Aspect Ratio Max. Linear Velocity		0.37 H/D 100 Cm/Hr at 45 Psig and 4 C	Column Elute A Column Elute B Column Regenerate Column Store
40 Prod. Ads. Chromatography LPLC	Column Capacity Column Oversize Factor Column Aspect Ratio Max. Linear Velocity		10 MG Prod./Hr Of Packing 1.5 Fold 0.37 H/D 100 Cm/Hr at 45 Psig and 4 C	Column Equilibration Column Wash Column Elute A Column Elute B Column Regenerate Column Store
41 Cont. Ads. Chromatography HPLC	Column Capacity Column Oversize Factor Column Aspect Ratio Max. Linear Velocity		30 MG Cont./Hr Of Packing 1.5 Fold 0.37 H/D 100 Cm/Hr at 45 Psig and 4 C	Column Equilibration Column Wash Column Elute A Column Elute B Column Regenerate Column Store
42 Cont. Ads. Chromatography MPLC	Column Capacity Column Oversize Factor Column Aspect Ratio Max. Linear Velocity		10 MG Cont./Hr Of Packing 1.5 Fold 0.37 H/D 100 Cm/Hr at 45 Psig and 400 C	Column Equilibration Column Wash Column Elute A Column Elute B Column Regenerate Column Store
43 Cont. Ads. Chromatography LPLC	Column Capacity Column Oversize Factor Column Aspect Ratio Max. Linear Velocity		10 MG Cont./Hr Of Packing 1.5 Fold 0.37 H/D 100 Cm/Hr at 45 Psig and 4 C	Column Equilibration Column Wash Column Elute A Column Elute B Column Regenerate Column Store
44 Size Excl. Chromatography HPLC	Load Capacity Length Max. Linear Velocity Void Volume		5% of Total Column Volume 100 Cm 100 Cm/Hr at 45 Psig and 4 C 25% Column Volume	Column Equilibration Column Wash Column Regenerate Column Store
45 Size Excl. Chromatography MPLC	Load Capacity Length Max. Linear Velocity Void Volume		5% of Total Column Volume 100 Cm 100 Cm/Hr at 45 Psig and 4 C 25% Column Volume	Column Equilibration Column Wash Column Regenerate Column Store
46 Size Excl. Chromatography LPLC	Load Capacity Length Max. Linear Velocity Void Volume		5% of Total Column Volume 100 Cm 100 Cm/Hr at 45 Psig and 4 C 25% Column Volume	Column Equilibration Column Wash Column Regenerate Column Store
47 Dilution	Dilution Factor		3 Liters/Liter	Dilution Time Additional Mix Time
48 Resolubilization	Reagent/Product Ratio Dissolution Time Additional Mix Time		0 L/Kg Product 0.50 Hours 0.50 Hours	Reagent 1 Concentration

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Group 2			Group 3		
	Soln.		Parameter	Soln.	
		3 Column Volumes 0 Column Volumes 1 Column Volumes 2 Column Volumes	Step Recovery of T.P. Temperature Regulation CIP SIP	N Y Y	95%
		5 Column Volumes 3 Column Volumes 3 Column Volumes 2 Column Volumes 1 Column Volumes 2 Column Volumes	Prod. Elution Volume Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	N Y Y	42% 95% 95%
		5 Column Volumes 3 Column Volumes 3 Column Volumes 2 Column Volumes 1 Column Volumes 2 Column Volumes	Prod. Elution Volume Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	N Y Y	42% 95% 95%
		5 Column Volumes 3 Column Volumes 3 Column Volumes 2 Column Volumes 1 Column Volumes 2 Column Volumes	Prod. Elution Volume Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	N Y Y	42% 95% 95%
		5 Column Volumes 3 Column Volumes 3 Column Volumes 2 Column Volumes 1 Column Volumes 2 Column Volumes	Prod. Elution Volume Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	N Y Y	42% Columns Volumes 95% 95%
		4 Column Volumes 1 Column Volumes 1 Column Volumes 2 Column Volumes	Prod. Elution Volume Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	N Y Y	42% Columns Volumes 95% 95%
		4 Column Volumes 1 Column Volumes 1 Column Volumes 2 Column Volumes	Prod. Elution Volume Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	N Y Y	42% Columns Volumes 95% 95%
		4 Column Volumes 1 Column Volumes 1 Column Volumes 2 Column Volumes	Prod. Elution Volume Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	N Y Y	42% Columns Volumes 95% 95%
		0.5 Hours 1 Hours	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	 Y Y Y	95% 95%
		Water Dist.	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP	 Y Y Y	95% 95%

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Unit Operation Type	Group 1			Parameter
	Parameter	Soln.		
49 Enzymatic Modification	Enzyme to Product Ratio Enzyme Concentration Reaction Temp. Reaction Duration		0.084 Liters of Enzyme Stock Per Liter of Start Proc. Vol. 2 Mg/ML 37 Degrees C 30 Minutes 100%	Titration Solution-1 Titration Solution-2 Neutralization
50 Lyophilization	Product Capacity/Load Product Unit Size		8 Units 100 Grams/Unit	Lyophilization Time Product Weight Reduction
51 Heat Exchange	Process Initial Temp. Process Final Temp. Utility Initial Temp. Utility Final Temp. Process Specific Heat Design Type(P.T.C)		98.6 Degrees C 39.2 Degrees C 34 Degree C 5 Degrees C 38.6 K BTU/Hr P	Exposure Time
52 Storage				
53 Fermentation Seed	Scale Up Ratio Fermentor Working Volume Antifoam A Antifoam B Base Acid		10 Fold 50 Liters 1 MI/L 1 MI/L 5 MI/L 5 MI/L	Growth Temperature Agitation Sparge Rate Back Pressure Total Duration
54 Initial Seeding	Flask Feed Volume Spinner Split Ratio uCarrier Density Number of PBS Washes Number of Media Washes No. of Media/Serum Washes		12 Liters 4 5 Ga/Liter 2 1 2 FBS	Serum Content Feed Rate Days to Confluence
55 Culture Vessel Split	Flask Feed Volume Spinner Split Ratio uCarrier Density Number of PBS Washes Number of Media Washes No. of Media/Serum Washes		12 Liters 4 5 Ga/Liter 2 1 2 FBS	Serum Content Feed Rate Days to Confluence
56 Culture Flask Split				
57 Stirred Tank Reactor				
58 Fluidized Bed Reactor	Process Initial Temp. Process Final Temp. Utility Initial Temp		37 Degree C 4 Degree C 2 Degree C	Exposure Time

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Group 2			Group 3		
	Soln.		Parameter	Soln.	
		0.067 L/L Process 0.02 L/L Process 0.57 L/L Process	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		95% 95% Y Y Y
		18 Hours 0.95	Step Recovery of Product Step Recovery of T.P. CIP SIP		95% 95% Y Y Y
		1 Hours	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		100% 100% Y Y Y
			Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		95% 95% Y Y Y
		37 Hours 1 HP/100L 1.5 VVM 5 PSIG 21 Hrs	Final OD CIP		12 Y
		2% FBS 1 Feed per vessel per 2 Days 2 Days	Amplification Factor		1
		2% FBS 1 Feed per vessel per 2 Days 2 Days	Amplification Factor		1
			Step Recovery of Product Step Recovery of T.P. CIP SIP		0.95 95% Y Y Y
		50% Hours	Step Recovery of Product Step Recovery of T.P.		0.95 100%

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Unit Operation Type	Group 1			Parameter
	Parameter	Soln.		
	Utility Final Temp. Process Specific Heat Design Type (P.T.C)		5 Degrees C 12 K BTU/Hr P	
59 Liquid/Liquid Extraction	Liquid/Liquid Ratio Extraction Temperature Addition Duration Additional Mix Duration Mix Energy		1 L Extraction/L Product 4 C 0.5 Hours 4 Hours 0.3 HP/100 L	Phase Separation Time Product Phase (Top/Bottom) Harvest Time
60 Solid/Liquid Extraction	Liquid/Liquid Ratio Extraction Temperature Duration Mix Energy		1 L Extraction/L Product 4 C 4 Hours 0.3 HP/100 L	Phase Separation Time Product Phase (Top/Bottom) Harvest Time

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MASTER PROCESS PARAMETERS TABLE-BIOPHARMACEUTICAL

Group 2			Group 3		
	Soln.		Parameter	Soln.	
			Temperature Regulation CIP SIP		Y Y Y
		1600% Hours Top 0.5 Hours	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		0.9 50% Y Y Y
		1600% Hours Top 0.5 Hours	Step Recovery of Product Step Recovery of T.P. Temperature Regulation CIP SIP		0.9 50% Y Y Y

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